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APPENDIX IV-C
to the 2003 AQMP

TRANSPORTATION CONTROL MEASURES

Southern California Association of Governments

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APPENDIX IVC

to the 2003 AQMP

TRANSPORTATION CONTROL MEASURES

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Mission Statement

Leadership, vision and progress that promote economic growth, personal well-being and livable communities for all Southern California.

The Association will accomplish this mission by:

- *Developing long-range regional plans and strategies that provide for efficient movement of people, goods and information; enhance economic growth and international trade; and improve the environment and quality of life.*
- *Providing quality information services and analysis for the Region.*
- *Using an inclusive decision-making process that resolves conflicts and encourages trust.*
- *Creating an educational and work environment that cultivates creativity, initiative and creativity.*

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SECTION 1
TRANSPORTATION STRATEGY

LINKING REGIONAL TRANSPORTATION PLANNING TO AIR QUALITY PLANNING

There is a direct link between air quality planning and regional transportation planning. The integration of air quality and transportation planning presents the challenge of balancing the real need for improved mobility with the equally important goals of cleaner air and the enhanced economic well being of communities. As the Federally-designated Metropolitan Planning Organization (MPO) for the six-county Southern California region, the Southern California Association of Governments (SCAG) is required by law to ensure that transportation activities "conform" to, and are supportive of, the goals of regional and state air quality plans. In addition, SCAG is a co-producer, with the District, of the mobile source portions of the AQMP for the South Coast Air Basin (SCAB).

The SCAG Region is the largest metropolitan planning area in the United States, encompassing 38,000 square miles. The Region is divided into 14 subregions and is one of the largest concentrations of population, employment, income, business, industry and finance in the world. The six-county SCAG Region is home to more than 17 million people, nearly half of the population of the state of California. The Gross National Product (GNP) equivalent for the Region shows that Southern California is the 12th largest economy in the world, with 7.4 million jobs, while the State, as a whole, constitutes the 6th largest economy in the world.

SCAG is responsible for the creation of the Region's long-range Regional Transportation Plan (RTP) and its short-term Regional Transportation Improvement Program (RTIP). The 2001 Regional Transportation Plan (RTP) represents the culmination of more than two years of work involving dozens of public agencies, 184 cities, hundreds of local, county, regional and state officials, the business community, environmental groups, as well as various nonprofit organizations, and was founded on a broad-based public outreach effort. A comprehensive list of Task Forces and Advisory Committees is included in Appendix L of the 2001 RTP [pp. L1-L20 <http://www.scag.ca.gov/rtp/webpdfs/appendix_L.pdf>].

The 2001 RTP constitutes the required three-year update to the 1998 Regional Transportation Plan (98 RTP), and was formally adopted by the SCAG Regional Council in April 2001, and approved by the federal agencies on June 8, 2001. The 2001 RTP provides a basis for the 2003 South Coast Air Quality Management Plan (AQMP), by establishing consistent estimates of projected regional growth, and forecast increases in transportation activities. It also provides the framework for aggregating sub-regional and local efforts to institute measures aimed at mitigating the adverse air pollution impacts from increased transportation activities. These measures are known as Transportation Control Measures (TCMs), and are the focus of this Appendix. The 2002 RTIP <http://www.scag.ca.gov/rtip/>, which was approved by federal agencies on October 4, 2002, provides the schedule and framework for the implementation of the Region's TCM strategies.

Key Planning Factors: Challenges and Objectives

As the 2001 RTP points out, the central challenge facing the South Coast Air Basin (SCAB) is the prospect that the regional population is expected to increase by almost 7 million people (40%), from 1997 to 2025, employment by 3 million jobs (43%), and the number of households by 2.2 million (30%). Other demographic factors, such as the rapid aging of the region's population profile and redistribution among the region's ethnic groups, are likely to affect residential location decisions and affect commute and general transportation choices. In addition, the growth of e-commerce and its effect on goods movement systems, carries some potential to alter patterns of land use, traffic congestion, and air quality in ways that can not yet be foreseen.

Accommodating this anticipated growth in a sustainable way—by taking account of ecological, economic and social factors, while enhancing quality-of-life indicators for present and future generations—represents the central challenge facing regional transportation planning in Southern California. Improvements in transportation mobility, both for people and for goods and services, and in progress toward meeting the National Ambient Air Quality Standards (NAAQS), must meet the goals of cost-effectiveness, environmental protection, and energy-efficiency.

Key Policy Factors: Constraints and Opportunities

In addition to the various and specific stipulations and requirements imposed by the Clean Air Act and the Transportation Conformity Rule, there are two sets of factors that will affect how TCM plans are shaped and managed. The first factor concerns the case-law emerging from the November, 2001, ruling by the US Court of Appeals, finding that the Metropolitan Transportation Commission (MTC) of San Francisco was out of compliance with their State Implementation Plan (SIP) for failing to meet the 15% increase in transit ridership goal embodied in their TCMs. In a memo summarizing the results of this court ruling, James Shrouds, Director, Office of Natural Environment, Federal Highway Administration (FHWA), quoted the Court in saying that "…where a SIP is violated, liability attaches, regardless of the reasons for the violation", and further asserted that two lessons needed to be drawn from that particular court case:[1]

- When an area is considering adding a TCM to the SIP, they must understand that the target or performance measures associated with the TCM are legally binding. They must be careful in adopting explicit targets.

- If TCMs become obsolete and are no longer applicable, areas must make sure that they work with EPA to either modify, remove, or replace them through the SIP process. Otherwise, the area is still obligated to implement the TCM. Not taking credits for emissions reductions associated with the TCM in the conformity analysis does not relieve an area's responsibility for compliance.

[1] http://www.fhwa.dot.gov/environment/tcm/mtc_m.htm

A second set of constraints are derived from the institutional structures and practices that shape air quality planning in the SCAB. In general, it should be recognized that regional transportation and air quality plans, and ultimately their resultant SIPs, embody a commitment of resources by the region as a whole. However, as the designated MPO for the Southern California region, and thus also for the SCAB, SCAG bases its responsibilities on the following four assumptions.

- There will be an appropriate commitment of fiscal resources from State and Federal sources.
- SCAG will continue to have responsibility over the official growth forecasts for the region.
- A two-tier monitoring system will be implemented and maintained to track both performance-based and expenditure-based goals and benchmarks.

- There will be an appropriate commitment supporting interagency consultation from local, State and Federal agencies involved in the process.

Additionally, the TCM strategy in the 2003 AQMP is predicated on the assumption that the following three Innovative Financial Strategies adopted by SCAG's Regional Council (RC) will be implemented as expected.

- State sales tax on gasoline revenues will continue to be dedicated to transportation-related projects per Proposition 42.

- A share of the county sales tax will be dedicated to transportation-related projects where necessary.

- State motor vehicle fuel excise tax rate and user-fees will be appropriately indexed to maintain their historic purchasing power.

Finally, it should be recognized that all the measures, discussed in detail below, are taken from the 2001 RTP and the 2002 RTIP, both of which have been deemed to be in conformity by the FHWA and by US EPA. <u>If any part of the two sets of assumptions, described above, are not implemented, or fail, the region risks falling out of conformity</u>.

IMPLEMENTING A REGIONAL TRANSPORTATION STRATEGY

The Transportation Strategy for the 2003 AQMP, as embodied in the 2001 RTP and the fiscally-constrained portion of the 2002 RTIP, is part of a comprehensive vision to improve air quality by reducing emissions from mobile sources, while at the same time enhancing mobility. The TCM strategies proposed in this section are best viewed as an interconnected system, with the various components augmenting and reinforcing one another, rather than merely a mechanical aggregation of stand-alone actions. This strategy outlines regional and sub-regional commitments to implement transportation improvements contained in the 2001 RTP and detailed

in the first two years of the 2002 RTIP. Collectively, they will reduce mobile source emissions and move the SCAB toward attainment of the NAAQS.

The RTIP is the short-range vehicle used to implement the goals and objectives of the long-range RTP. The RTIP is a biennial report with a time-horizon of six years, the first two years being fiscally constrained. A full, illustrative list of these projects[2], which include all TCM strategies, can be found in Appendix K of the 2001 RTP [p. K2-K11], and is appended to this document. The RTIP constitutes the Region's spending plan for anticipated transportation improvements, and contains a list of projects proposed for funding or approval by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). This Transportation Strategy continues the blueprint contained in the 1997/98 State Implementation Plan (SIP) previously submitted to EPA.

The region's attainment of federally mandated air quality standards may only be feasible with the aggressive use of advanced transportation technologies and new market-based programs. Along with these innovative approaches, more traditional infrastructure improvements, system management, and information services are being pursued within the context of a broad vision of the region's future. This vision integrates air quality, mobility, community quality-of-life, and economic development goals described in SCAG's Regional Comprehensive Plan and Guide and reaffirmed in the 2001 RTP. This transportation strategy is intended to maximize the emission reductions that can realistically be expected to be achieved from on-roadmobile sources. However, it should be recognized at the outset that potential improvements in air quality deriving from TCM strategies applied to on-road mobile sources are limited. To attain the NAAQS, the Region will need to continue its focus on reductions from other emission source categories, as well as from on-road mobile sources.

Historic Trends: Context and Conditions

As shown in Table 1, between 1980 and 2000, both population and employment have increased substantially. During this same time period, the absolute number of home-to-work vehicle trips increased by 25 percent. However, the percentage increase in people driving to work alone is disproportionately greater than the percentage increase in people using transit. The percentage increase in people sharing rides to work also lags appreciably. The absolute number of people that either work at home (including telecommuting), or ride a bicycle or walk to work, has dropped significantly for this same period.

Clearly, and through the year 2000, the rate of increase in people riding transit and sharing rides to work has not kept pace with the rate of increase in home-to-work trips. There is a strong historic trend toward driving alone, and a primary goal of the RTP is to counter this trend.

[2] This list of projects, taken from the 2001 RTP, is based on the 2000 RTIP. It should be noted that only the first two years of the six-year biennial RTIP are required to be fiscally constrained, and that TCM projects always have funding priority over other, non-TCM projects. Thus, while not all the fiscally constrained projects are TCMs, all TCM projects are fiscally constrained. For both these reasons, the list attached to this document is best taken as illustrative, rather than exact. The most current list of fiscally constrained projects can be found at <http://www.scag.ca.gov/rtip/>

This is one of the key challenges addressed by the 2001 RTP, and will continue to be a central concern for some time to come—ensuring that the proportion of transit and ride-share trips, as well as the usage of bicycles and information technology-based strategies, increase their share of the total work-trips for the region, particularly over the next decade.

Table 1
Long-term Transportation System Trends: Southern California Region

	1980	2000	Change	% Change
Population	11,074,483	15,429,162	4,354,679	39%
Employment	5,402,323	7,089,958	1,687,635	31%
Total Home-to-Work Trips	4,898,642	6,102,839	1,204,197	25%
Drive Alone	3,493,490	4,648,117	1,154,627	33%
Carpool	844,424	960,356	115,932	14%
Transit	260,075	310,382	50,307	19%
Other	300,653	183,984	(116,669)	-39%

Growth Forecasts: Linking Socio-Economic Profiles to Land Use Patterns

As the designated MPO for the Southern California region, SCAG is responsible for generating the socio-economic profiles and growth forecasts on which land use, transportation, air quality management and implementation plans are based. The growth forecasts provide the socio-economic data used to estimate vehicle miles travel (VMT). Emission estimates can then be forecast based on these projected VMT estimates.

The monitoring of changes in regional socio-economic profiles is a key factor in tracking changes in land use patterns as they affect transportation system usage and, thus, air quality impacts. For instance, changes in growth forecasts alone, between the 1998 RTP and the 2001 RTP, resulted in approximately an 8 ton decrease in emission estimates for the region, due to reductions in growth-related VMT forecasts. SCAG is currently generating an analytic comparison of the air quality impacts of changes in socio-economic profiles for the 2010 forecasts between the the 1998 RTP and the 2001 RTP. The analysis would model the air quality impacts of changes in land use due to proposals contained in the 2001 RTP. The measures contained in the 2001 RTP are expected to demonstrate an overall reduction in emissions for the region of approximately 17 tons per day in volatile organic compounds (VOC), by the year 2010.

This reduction in emissions due to changes in the socio-economic profile of the region are an important way of taking account of changes in land use patterns. For example, changes in jobs-housing balance due to the outcomes of the federally mandated Regional Housing Needs Assessment (RHNA) process, induce changes in VMT by more closely linking housing to jobs. Thus, socio-economic growth forecasts are a key component to guide the SCAB Region toward

attainment of the NAAQS. SCAG provides the mechanisms by which changes in socio-economic profiles, which affect land use patterns, can be monitored on a systematic and on-going basis.

Based on the increases in population and employment that are expected, the transportation strategy calls for providing significant levels of investment in HOV infrastructure, transit and systems management, as well as in the development of alternative modes of travel, to help manage the increasing demands that will be placed upon the existing transportation system over the next decade or so.

TRANSPORTATION CONTROL MEASURES: BACKGROUND

TCMs are defined as strategies which adjust trip patterns or otherwise modify vehicle use in ways that reduce air pollutant emissions, and which are specifically identified and committed to in the 2003 AQMP. TCMs are included in the AQMP as part of the overall control strategy to demonstrate the region's ability to come into attainment with the NAAQS. While TCMs are intended to increase mobility and decrease air pollution, they play a limited role in the overall strategy to reduce emissions, because traffic patterns and vehicle use are dominantly driven by individual choices made by users of the transportation system. Historically, the majority of emission reductions from mobile sources have come from technological improvements in vehicle engines and fuel, which are stipulated by the US Environmental Protection Agency (USEPA) and the California Air Resources Board (CARB). By law, and according to the Transportation Conformity Rule, vehicle technology-based, fuel chemistry-based and fleet maintenance-based measures can not be considered to be TCMs.

A definition of TCMs is provided in EPA's Transportation Conformity Rule - 40 CFR Parts 51 and 93 (August 15, 1997) <http://www.epa.gov/oms/transp/traqconf.htm>:

> *Transportation control measure (TCM) is any measure that is specifically identified and committed to in the applicable implementation plan that is either one of the types listed in §108 of the CAA, or any other measure for the purpose of reducing emissions or concentrations of air pollutants from transportation sources by reducing vehicle use or changing traffic flow or congestion conditions. Notwithstanding the above,* ***vehicle technology-based, fuel-based, and maintenance-based measures which control the emissions from vehicles under fixed traffic conditions are not TCMs*** *for the purposes of this subpart.*

The Rule also defines the criteria and procedures for timely implementation of TCMs as follows:

> *§93.113 Criteria and procedures: Timely Implementation of TCMs*
>
> *(c) For TIPs, this criterion is satisfied if the following conditions are met:*
>
> *(1) An examination of the specific steps and funding source(s) needed to fully implement each TCM indicates that TCMs which are eligible for funding under title 23 U.S.C. or the Federal Transit Laws are on or ahead of the schedule established in*

the applicable implementation plan, or, if such TCMs are behind the schedule established in the applicable implementation plan, the MPO and DOT have determined that past obstacles to implementation of the TCMs have been identified and have been or are being overcome, and that all State and local agencies with influence over approvals or funding for TCMs are giving maximum priority to approval or funding of TCMs over other projects within their control, including projects in locations outside the nonattainment or maintenance area.

(2) If TCMs in the applicable implementation plan have previously been programmed for Federal funding but the funds have not been obligated and the TCMs are behind the schedule in the implementation plan, then the TIP cannot be found to conform if the funds intended for those TCMs are reallocated to projects in the TIP other than TCMs, or if there are no other TCMs in the TIP, if the funds are reallocated to projects in the TIP other than projects which are eligible for Federal funding intended for air quality improvement projects, e.g. the Congestion Mitigation and Air Quality Improvement Program.

(3) Nothing in the TIP may interfere with the implementation of any TCM in the applicable implementation plan.

Section 108(f)(1)(A) of the Federal Clean Air Act Amendments[3] lists the following sixteen measures as illustrative of TCMs. However, this list should not be considered exhaustive.

i. *Programs for improved use of public transit;*

ii. *Restriction of certain roads or lanes to, or construction of such roads or lanes for use by, passenger buses or high occupancy vehicles;*

iii. *Employer-based transportation management plans, including incentives;*

iv. *Trip-reduction ordinances;*

v. *Traffic flow improvement programs that achieve emission reductions;*

vi. *Fringe and transportation corridor parking facilities, serving multiple occupancy vehicle programs or transit service;*

vii. *Programs to limit or restrict vehicle use in downtown areas or other areas of emission concentration, particularly during periods of peak use;*

viii. *Programs for the provision of all forms of high-occupancy, shared-ride services, such as the pooled use of vans;*

[3] See: http://www.epa.gov/oar/caa/contents.html

ix. *Programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of non-motorized vehicles or pedestrian use, both as to time and place;*

x. *Programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas;*

xi. *Programs to control extended idling of vehicles;*

xii. *Programs to reduce motor vehicle emissions, consistent with Title II of the Clean Air Act, which are caused by extreme cold start conditions;*

xiii. *Employer-sponsored programs to permit flexible work schedules;*

xiv. *Programs and ordinances to facilitate non-automobile travel, provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity;*

xv. *Programs for new construction and major reconstruction of paths, tracks or areas solely for the use by pedestrian or other non-motorized means of transportation, when economically feasible and in the public interest; and*

xvi. *Programs to encourage the voluntary removal from use and the marketplace of pre-1980 model year light duty vehicles and pre-1980 model light duty trucks.*

In addition to the measures listed above, other measures may be considered as TCMs if they reduce emissions or concentrations of air pollutants from transportation sources by modifying vehicle use, changing traffic flow, or mitigating traffic congestion conditions. TCMs may be voluntary programs, incentive-based programs, regulatory programs, as well as market- or pricing-based programs.

It is SCAG's responsibility to ensure that TCM strategies are funded in a manner consistent with the AQMP's implementation schedule. The transportation conformity process is designed to ensure timely implementation of TCM strategies, thus reinforcing the link between AQMPs and the transportation planning process. If the implementation of a TCM strategy is delayed, or if a TCM strategy is only partially implemented, areas are required to make up the shortfall by either substituting a new TCM strategy or by enhancing other control measures through the SIP element renewal process.

Relation of Current TCM Components To Previous Plans

The TCM components listed in this document are consistent with the TCM elements proposed in previous plans. The components specified in the current TCM replace all components contained in previous AQMPs and their resultant SIP elements.

The 1997 AQMP (as amended in 1999) listed five advanced transportation technology measures (ATT-01 through ATT-05) which were not considered to be TCMs, but were included as part of the Region's overall transportation control strategy. Two of these measures, ATT-03, *Zero Emission Vehicles*, and ATT-04, *Alternative Fuel Vehicles*, have been eliminated from the 2003 AQMP because vehicle technology and alternative fuels are not TCMs, by definition.

ATT-01, ATT-02 and ATT-05, focused on *Telecommunications*, *Advanced Shuttle Transit* and *Intelligent Transportation Systems*, respectively. In an effort to reduce redundancy, the measures described under ATT-02 have been consolidated into TCM-1B, *Transit and Systems Management Measures*. Similarly, the measures described under ATT-01 and ATT-05 have been consolidated into TCM-1C, *Information-based Measures*.

TABLE 2

Transportation Control Measures (TCMs)
Based on the Currently Approved 2001 Regional Transportation Plan (RTP),
and Consistent with the Regional Transportation Improvement Program (RTIP)

MEASURE	IMPLEMENTATION
TCM-1A High Occupancy Vehicles (HOV) Measures	**Action:** HOV Projects **Investment:** The 2001 RTP investment is $430 million in HOV improvement projects from 2003 through 2010. **Performance Criteria:** Implementation of the 2001 RTP will provide the following lane-miles by 2010. Los Angeles County: 610 miles Orange County: 261 miles Riverside County: 98 miles San Bernardino County: 156 miles **Responsible Agencies:** SCAG, CTCs, Caltrans
TCM-1B Transit and Systems Management	**Action:** Bus, Rail and Shuttle Transit Improvements **Investment:** The 2001 RTP public investment in transit is $3.281 billion from 2003 through 2010. This includes all fixed-route bus service (including local, express, rapid bus), light rail service, and commuter rail/Metrolink service. **Performance Criteria:** Maintain 1997 per capita ridership levels (34.9 annual transit trips per person) **Responsible Agencies:** SCAG, CTCs, Caltrans, Transit Operators, Local Governments **Action:** Bicycle and Pedestrian Facilities **Investment:** The 2001 RTP investment in non-motorized (bicycle and pedestrian) facilities is $210 million from 2003 through 2010. **Performance Criteria:** Not Applicable **Responsible Agencies:** SCAG, CTCs, Caltrans, Transit Operators, Local Governments **Action:** Park and Ride Lots and Intermodal Transfer Facilities

MEASURE	IMPLEMENTATION
	Investment: Shares investment with Transportation Demand Management (TDM) strategies below, which provides $76 million from 2003 through 2010 in the 2001 RTP. **Performance Criteria:** Not Applicable **Responsible Agencies:** SCAG, CTCs, Caltrans **Action:** Goods Movement Facilities (Baseline projects and SR-60 truck lane) **Investment:** The 2001 RTP investment in goods movement facilities is $3.641 billion, from 2003 to 2010. **Performance Criteria:** Reduce average work trip travel time by 7% over Baseline **Responsible Agencies:** SCAG, CTCs, Caltrans, Transit Operators, Local Governments
TCM-1C Information Based Measures	**Action:** Rideshare and Transit Marketing Program and implement marketing information services for employers and activity centers to encourage shared rides, transit use, and transit pass centers, through RTIP. **Investment:** The 2001 RTP investment in rideshare services is $82 million from 2003 through 2010. This strategy also shares investment with TDM strategies below, which is $76 million from 2003 through 2010. **Performance Criteria:** Implementation of the RTP will increase the number of commuter vanpools from 2,000 to 5,000 by 2010, through more effective marketing and provision of non-monetary public sector initiatives. Support the maintenance of existing carpool market share with an increase of 8,000 carpoolers per year beyond existing level). **Responsible Agencies:** SCAG, CTCs **Action:** Intelligent Transportation Systems (ITS) which includes Urban Freeway System Management Improvements, Smart Corridors System Management Programs and Congestion Management Plan-based demand management strategies. **Investment:** The 2001 RTP investment in ITS is $221 million from 2003 through 2010. **Performance Criteria:** Facilitate 5% arterial and 2.5% freeway improvements (flow, speed, etc.) in roadway vehicle capacity. **Responsible Agencies:** SCAG, CTCs, Caltrans, Transit Operators, Local Governments **Action:** Telecommuting Facilities **Investment:** Shares investment with TDM strategies, below, which provides $76 million from 2003 through 2010 in the 2001 RTP. **Performance Criteria:** Targets 6.8% decrease in 2010 Home to Work trips, from 1990 levels **Responsible Agencies:** SCAG, CTCs, Caltrans, Transit Operators, Local Governments **Action:** TDM Demonstration Programs **Investment:** The 2001 RTP investment in TDM improvements (park-and-ride, work-at-home, telecommuting) is $76 million from 2003 through 2010. **Performance Criteria:** See performance criteria for Rideshare and Transit Marketing **Responsible Agencies:** SCAG, CTCs, Caltrans, Transit Operators, Local Governments

System-level Emission Reductions

Actual estimates of the total emission reductions attributable to an RTP, taken cumulatively and as a whole, differ significantly from the value derived by mechanically adding up the emission reductions of individual TCM components. This is because there are overlapping effects between the various strategies, when considered individually and separately, resulting in a misleading double-counting effect. Thus, it is importation that estimates of the actual emission reductions indicated by the 2001 RTP should be quantified only at the system-level.

Transportation projects and programs funded exclusively through local monies are not included in the proposed TCM strategies, as such projects are not included in the 2002 RTIP. The enforceable commitment for these measures is to fund and implement projects and programs contained in the first two years of the current six-year RTIP. The remaining four years of the RTIP represent expectations in project scope and design only. Between the end of the RTIP and the year 2010, the RTP provides a sketch of the programs and projects expected to be in place by that date, and for which funding is anticipated to become available through the RTIP process. Although the specific mix of projects to be funded with future RTIP dollars may ultimately change, the emission reductions anticipated, in aggregate, from these projects, set a key benchmark in determining the transportation sector's contribution to a mobile source emission budget and its associated conformity determination.

One of the key goals of conventional transportation planning has been the provision of sufficient roadway capacity to reduce congestion and improve mobility. There has been some debate regarding the extent to which capacity enhancement projects actually succeed in relieving congestion—the countervailing argument being, that, as capacity is increased (for instance by the addition of lanes or roadways) demand itself increases to fill these new facilities. As a consequence, and because the demand for roadway facilities is responsive to changes in supply, only some fraction of the hoped for congestion relief actually materializes, while actual congestion levels remain largely unchanged.

However, improvements to regional networks of highways and arterials do, in fact, result in some degree of congestion relief. To the extent that congestion is actually relieved, there are regional air quality benefits to such flow-improving interventions. It is difficult to find some definitive way to quantify these benefits, except by doing a system-level test of emissions resulting from a full implementation of the whole RTP, compared to the emissions resulting from some form of no-project alternative. This is one of the main reasons why regional transportation agencies have argued that the air quality and environmental benefits of transportation improvements cannot be additively computed, but must be viewed at the level of the whole system.

The discussion of specific TCM measures and strategies, below, should be viewed in this light. The test of emission benefits resulting from regional transportation planning efforts within the SCAB must be performed by considering the integrated effects of all measures contained within the 2001 RTP, rather than by testing each individual TCM component and then adding them all up.

TRANSPORTATION CONTROL MEASURES: IMPLEMENTATION

The measures and strategies listed below replace the TCM strategies contained in the 1997 AQMP and all versions thereof, and include three categories of transportation improvement projects and programs:

- High occupancy vehicle (HOV) measures[4],
- Transit and Systems Management measures, and

[4] The HOV designation applies to passenger cars with two or more passengers, van-pools, shuttles, and buses.

- Information-based measures

Transportation projects and programs that are funded exclusively through local monies are not included in the TCM strategies discussed below, as such projects and programs are not required to be included in the RTIP.

The TCM strategies in this document are defined by the specific action or intervention, investment and performance criteria.

TCM-1A: HOV Measures

This measure explicitly replaces the HOV Implementation Guidelines in 40 CFR 52.263. One key strategy to incentivize the desired shift from single occupancy vehicle ridership, to high occupancy vehicle (HOV) ridership is by the provision of one or more lanes dedicated solely to the use of such HOVs. Then, as congestion increases on the conventional, mixed-flow lanes, the relatively uncongested HOV lane appears increasingly attractive to single occupancy vehicle riders, who might then consider car pooling as a more desirable alternative to driving alone. The purpose of HOV lanes is to relieve congestion by maximizing the person-carrying capacity of the roadway, by reducing the number of vehicles needed to transport the total number of commuters to and from their place of work, and so reduce air pollutant emissions. Because HOV lanes carry vehicles with a higher number of occupants, they may move significantly more people during congested periods, even if the number of vehicles that use the HOV lane is lower than those carried by the adjoining general purpose lane.

The following strategies are some typical improvements that have the potential to enhance the effectiveness of HOV lanes:

- Provide Park-and-Ride types of facilities at strategic locations to support potential car pooling for parts of the commute trip;
- Enhance inter-modal connectivity between transit services and HOV corridors;
- Change the occupancy requirements or hours of operation for use of specific HOV lane segments; and
- Explore the potential of congestion pricing—in which single occupancy vehicles are allowed to use certain HOV lane segments upon payment of a fee—to redistribute the volumes of traffic away from rush hour peaks.

HOV Measures Investment and Performance Criteria

The 2001 RTP investment is $430 million in HOV improvement projects from 2003 through 2010. Implementation of the 2001 RTP will provide the following lane miles by 2010.

- Los Angeles County: 610 miles
- Orange County: 261 miles

- Riverside County: 98 miles
- San Bernardino County: 156 miles

TCM-1B: Transit and Systems Management Measures

The set of interventions and strategies considered under Transit and Systems Management all involve a net increase[5] in the construction and provision of physical facilities and hard infrastructure for modes of transportation other than single-occupancy vehicles. These strategies reduce congestion and air pollutant emissions. The following are some examples of such strategies:

- Bus, Rail and Shuttle Transit Improvements: Public transit, such as bus, rail and shuttles, is an alternative to the conventional and more prevalent single occupancy automobile that can reduce emissions by increasing the average vehicle ridership (AVO). Improvements to the system to increase transit ridership and decrease the reliance on single occupancy vehicles can be accomplished by carefully monitoring the transit routes and making changes where needed. Changes may include adding routes, providing better passenger information systems, increasing marketing efforts, and integrating transit modes for improved convenience. [RTP 2001:p. 58-60; 69-79]

- Bicycle and Pedestrian (non-motorized) Facilities: Bicycle and pedestrian facilities encourage bicycle and pedestrian travel by increasing sidewalks, paths, and crosswalks. Other measures may include enhanced protection from fast vehicular traffic, pedestrian-activated traffic signals and the shading of walkways and bus stops.[6] [RTP 2001:p. 68; 105-106]
- County and Corridor-based Vanpool and Carpool Programs: Vanpools are a commute strategy to decrease the use of single occupant vehicles. They usually operate within an organized route and schedule, and consist of seven to fifteen people sharing a van from fixed and designated origin and destination points, usually operating at limited scheduled times. The provision of seed money for the formation of location-specific Transportation Management Associations (TMAs), can benefit the transportation system as well. Such interventions allow for the creation of highly localized innovations, such as the organization of a shuttle service for shoppers at large grocery stores, or designated shuttle services to better connect event centers to remote parking facilities in downtown areas. [RTP 2001:p. 65; 103]

[5] In all cases it should be noted that increases in investment required to affect improvement in the environmental effects of transportation have to be net increases, over and above increased facilities required due to population and socio-economic growth.

[6] It should be noted, however, that increases in bicycle and pedestrian traffic may not, in themselves, result in some corresponding reduction in motorized work trips, but might simply reflect increases in recreational or health-oriented usage of the system, induced by the provision of the facilities in the first place. Although there are real societal benefits to increases in bicycling and walking, the environmental and air quality benefits may be more tenuous.

- Park & Ride Lots and Intermodal Transfer Facilities: Park-and-ride facilities provide a safe and convenient location for commuters to switch from single occupant vehicles to high occupancy modes such as bus, rail, carpools and vanpools. Intermodal facilities allow commuters to transfer conveniently from one mode of transit to another—such as, subway-to-busway stations, or busway-to-vanpool connections. [RTP 2001:p. 67: 104]

- Goods Movement Facilities: These could take any of several forms, from dedicated, single-mode corridors, to remote goods and freight handling facilities. This type of improvement program often eliminates traffic conflicts at highway crossings and reduces traffic delays. Remote freight and goods handling infrastructure for airports and sea ports are other examples of projects that can benefit the regional transportation system by shifting congestion and dispersing pollution effects.[7] [RTP 2001:p. 89-98]

Bus, Rail and Shuttle Transit Improvements Investment and Performance Criteria

The 2001 RTP public investment in transit facilities is $3.281 billion from 2003 through 2010. This includes all fixed-route bus service (including local, express, rapid bus), light rail service, and commuter rail and Metrolink service. [RTP 2001:p. 79-86]

SCAG's Transportation and Communications Committee (TCC) adopted the goal of maintaining 1997 per capita ridership levels (34.9) through the planning horizon of the 2001 RTP. The modeling analysis conducted for the 2001 RTP shows that, by 2025, the RTP actually exceeds this goal (42.1).

SCAG's Regional Transit Task Force has identified the following specific actions to enhance transit services [RTP 2001:p. 85-86].

- Transit Service Management actions
- Transit Demand Management actions
- Growth Management actions
- Institutional actions

Bicycle and Pedestrian Facilities Investment and Performance Criteria

The 2001 RTP investment in non-motorized (bicycle and pedestrian) facilities is $210 million, from 2003 through 2010. The following Actions are included in the 2001 RTP [p.105-106]:

[7] Remote goods handling facilities linked to specific ports may or may not result in a net reduction in congestion, air pollution or other adverse impacts. However, as most mature ports are usually locked in by relatively high-density land uses, and most remote facilities are constructed in areas that are relatively less developed, human exposure to noise and pollutants is likely to be reduced.

- Determine the potential and desired mode split of non-motorized modes in congestion reduction and adopt vision, goals and objectives accordingly.

- Determine the ability of the existing non-motorized system to achieve the desired vision, goals, objectives and update and implement the existing SCAG regional plan as appropriate.
- Identify and develop strategies to address institutional, transportation, funding, infrastructure and other barriers to the effective use of non-motorized transportation for commute purposes.
- Identify strategies to link non-motorized transportation funding programs to standards for Livable Communities and transit programs by providing communities flexibility in how they address Livable Communities goals and programs.

- Fund the development and implementation of pedestrian and bicycle safety and education programs aimed at persons of all ages, potential bike commuters and motorists.

- Sponsor legislation and/or ordinances to increase the enforcement of bicycling and driving laws to provide a safer climate for pedestrians and cyclists.

- Develop and implement bicycle incentive programs that recognize and reward employees for bicycle use similar to those that reward transit use

- Introduce legislation that provides for business tax credits and other incentives to encourage the use of bicycles.

Park & Ride Lots and Intermodal Transfer Facilities Investment and Performance Criteria

The Park and Ride Lots and Intermodal Transfer Facilities intervention shares investment with Transportation Demand Management (TDM) strategies. The 2001 RTP investment in TDM strategies is 76 million dollars from 2003 through 2010. There is no applicable performance criteria defined in the 2001 RTP for this intervention.

Goods Movement Facilities Investment and Performance Criteria

The Goods Movement section of the 2001 RTP, deriving from the work of the Goods Movement Advisory Committee (GMAC) and the Truck Lane Task Force, primarily addresses recommendations for: truck lanes, railroad grade crossing improvements, the subregional freight studies, improved freight productivity and transportation funding for freight movement. The 2001 RTP investment in goods movement facilities is 3.641 dollars from 2003 through 2010. The 2001 RTP goal is to reduce average work trip travel time by 7% over baseline.

TCM-1C: Information-based Measures

Unlike the measures discussed above, which all rely on the construction, provision and maintenance of substantial physical facilities, or hard infrastructure, the information-based interventions rely primarily on the provision of information as the root intervention. Improving the information content of the transportation system, without the construction of additional capital facilities and hard infrastructure, has been shown to affect the travel behavior and mode choices of consumers in ways that benefit the overall regional transportation system. These improvements reduce congestion and mitigate air pollution, as well as other adverse environmental impacts of transportation activity.

Access to better and more timely data— for both transportation system managers and individual users —changes the ways in which the system is used, and has been shown to result in individual transportation decisions that improve some of the adverse impacts of growth in transportation activity.

Information-based measures offer innovative ways of reducing vehicle congestion and emissions, especially when combined with system management strategies, facility improvements, and service enhancements, as well as coordinated outreach campaigns. Some examples of such information-based measures relevant to the SCAG Region and to the South Coast Air Basin (SCAB) are:

- Rideshare Services and Transit Marketing: The RTIP programs and implements the marketing of information services for employers and activity centers, to encourage the sharing of rides (vanpools and carpools) and the use of transit system as a means of increasing the average vehicular ridership (AVR) rates. Vanpools are a commute strategy to decrease the use of single occupant vehicles. They usually operate within an organized route and schedule, and consist of seven to fifteen people sharing a van from fixed and designated origin and destination points, usually operating at limited scheduled times. Large employment centers may be targeted for programs that support and market transit services, such as the sale of transit passes and the availability of transit schedule information.

- Intelligent Transportation Systems (ITS): ITS projects employ a variety of technologies to improve the performance of transportation systems. ITS projects include the Smart Corridors Management Program, which promotes the efficient use of existing highway and transit systems, reducing congestion and air pollution while enhancing safety and mobility. Implemented technologies may also include improvements to signal synchronization, transit operations management and interagency coordination. In addition, Urban Freeway System Management incorporates traffic flow strategies which help alleviate congestion and reduce air pollutant emissions. Such strategies usually include advanced technologies such as vehicle detectors, closed circuit TV cameras and ramp meters which are part of an ITS which improves the efficiency of the freeway system.

- Telecommunication Facilities/Satellite Work Centers: Telecommunication Facilities and Satellite Work Centers are defined as working at an alternate work location and communicating with the usual place of work using electronic or other means, instead of

physically traveling to the work site. It is a strategy used to reduce VMT by employees who would otherwise travel to and from work.

- Transportation Demand Management (TDM): TDM generally refers to policies, programs and actions that are directed toward decreasing the use of single occupancy vehicles. TDMs also can include activities to encourage a shifting or spreading of peak travel periods. These strategies generally refer to policies, programs and actions that are directed towards decreasing the use of single occupant vehicles during peak load hours.

Rideshare Services and Transit Marketing Investment and Performance Criteria

The 2001 RTP investment in rideshare services is 82 million dollars from 2003 through 2010. This strategy also shares investment with TDM strategies, which is 76 million dollars from 2003 through 2010 in the 2001 RTP.

The following Actions are contained in the 2001 RTP [p. 102-104]:

- Formalize and expand the existing partnership among public and private sector stakeholders to improve delivery of vanpool services regionwide.
- Increase the number of commuter vanpools from 2,000 to 5,000 through more effective marketing and provision of non-monetary public sector initiatives.
- Establish a dedicated funding source for planning and the implementation of vanpool programs and services.
- Improve the provision of vanpool services in the Region through the public sector's increase of dedicated staffing and resources.
- Facilitate and regionally coordinate marketing strategy among the public and private sectors that would enhance vanpool programs, increase ridership and unify the current limited and fragmented outreach efforts.
- Support the maintenance of the existing carpool market share and an increase in carpooling (increase of 8,000 carpoolers per year beyond existing levels).
- Continue to support funding for education and outreach to the general public in order to increase awareness and participation in carpooling and vanpooling.

Intelligent Transportation Systems (ITS) Investment and Performance Criteria

The 2001 RTP investment in ITS is approximately 221 million dollars from 2003 through 2010. The following Action is contained in the 2001 RTP (p. 107):

ITS, where applicable, shall be included in, and implemented through, mainstream planning and programming processes. And, where feasible and applicable, ITS should be incorporated as an operational component, in the design and construction of new federally funded facilities, or in the procurement processes for new equipment, consistent with the requirements of the National Architecture rule.

The measure designated as ATT-05 in the 1997 AQMP assumed a 5% improvement in roadway capacity due to the implementation of ITS projects. However, it is clear, today, that the 5% assumption was conservative and will likely be exceeded by the 2010 date. The 5% increase in capacity for ITS was an assumption based upon a national Peer Review meeting that SCAG hosted in 1998. The assumption was based upon a recognition that the transportation model being used at that time failed to fully account for changes due to operational improvements. This assumption allowed for a capacity increase on the speed/flow curve to "mimic" the ITS effects in modeling. Today, a new generation of analytic tools is available, which may allow a better estimation of ITS benefits for very specific measures, and SCAG expects to refine its ability to track and monitor ITS investments in a more realistic way.

The Preliminary Draft Statewide Traffic Management System (TMS) Plan reports up to a 50% loss of throughput due to congestion, and an ability of ITS operational improvements to reduce total State Highway system congestion by 20%, through operational ITS measures use to restore lost capacity to the system. In addition, and for the first time, new software products give SCAG a means of estimating emissions reductions from non-recurrent ITS-based safety improvements, and then quantifying such improvements using the most recent version of California's emission factor model (EMFAC).

Telecommuting Investment and Performance Criteria

The investment in telecommuting shares investment with TDM strategies, which is $76 million from 2003 to 2010. The 2001 RTP further targets a 6.8% decrease in 2010 home to work trips from 1990 levels.

According to 1990 Census data, there were 6,844,948 workers in the SCAG region and 2.7% of these workers worked at home or telecommuted, which translates to approximately 185,000 workers. The 2001 RTP provides a projection of 8,779,000 workers in the SCAG region by 2010 and approximately 7.9% [RTP Community Link 21, Technical Appendix Vol.3 of 3, P. J-9] of the work force will be either telecommuting or working at home. This translates into a reduction of approximately 693,500 commuter home-to-work trips. That is to say, approximately 508,500 additional workers will be taken "off the road" between 1990 and 2010 due to telecommuting and work-at-home incentives. In other words, the 2001 RTP implementation could result in an increase in working at home between 1990 and 2010 by as much as 7.4% of 1990 workers. Actions considered under this measure would include, but not be limited to:

- Continue working with interagency working groups to finalize the design of an emission trading pilot program based on telecommuting.

- Pursue an aggressive education and public outreach program, particularly at work sites with less than 250 employees. This may include a program to generate tax deductions for emissions reduced.

- Consider an emissions trading program that would allow employers not regulated by Rule 2202, as well as those that are, to trade telecommute credits for reaching average vehicle ridership (AVR) goals.

Transportation Demand Management Investment and Performance Criteria

The 2001 RTP investment in TDM improvements is 76 million dollars from 2003 through 2010 in the 2001 RTP. In order to allow maximum flexibility and effectiveness in implementing these strategies, the specific breakdown of investment, by program component, is left to the discretion of the local or sub-regional implementing agencies—in this case the County Transportation Commissions.

It has been argued that one of the reasons individuals choose to drive to a particular destination, often alone, is that they may lack convenient access to information about alternative modes to travel, such as buses and subways, or bicycle routes. Then, internet-based or kiosk-type automated transit trip planning systems, such as SCAG's TranStar <http://www.scag.ca.gov/transit/> and the prototype Travel Advisory News Network (TANN) <http://www.tann.com/>, may successfully influence an individual's decision to use public transit instead of an automobile—whether by making the unfamiliar transit trip more transparent in terms of schedule and route information, or by underscoring the level of congestion on freeways and arterials and thus making transit seem more attractive by comparison. The use of such systems may also defer a particular trip to a non-peak hour time, thus reducing congestion and its associated adverse air quality impacts.

Information-based interventions, such as Transportation Demand Management (TDM) projects, are managed by the Southern California Economic Partnership (the Partnership) <http://www.the-partnership.org/index.htm> The Partnership was founded several years ago in a collaborative effort by SCAG, Caltrans and SCAQMD to help in their joint objectives of developing and fostering new technologies that make significant contributions to the achievement of traffic congestion and mobile source emission reduction goals. The Partnership is overseen by an 18 member board of directors made up of representatives from both the public and private sectors including a representative from SCAG, SCAQMD, Caltrans and the sub-regional transportation commissions (CTCs). The Partnership is overseeing the implementation of a wide variety of innovative and cutting-edge projects.

In addition, SCAG's Regional Council has established a Regional Transportation Demand Management Task Force (RTDM), comprising of elected officials and planners throughout

the Region. This Task Force reviews and recommends specific actions to make TDM measures more effective within the Region.

Other potential actions to reduce congestion and emissions through information-induced changes in individual travel-related decision making include:

- promoting multi-modal strategies to maximize all options available to commuters;
- targeting peak period trips for reduction;
- marketing and promoting the use of HOV lanes to the general public;
- marketing and promoting rail lines to the general public;
- educating the public regarding cost, locations, accessibility and services available at park and ride lots;
- promote and market vanpool formation and incentive programs;
- promoting ride-matching through the internet and other means of making alternative travel option information more accessible to the general public.

Enforceability, Monitoring and Funding

The TCM strategies contained in, and implemented as part of the current AQMP are expected to be real, quantifiable, and enforceable. The region's long-range transportation blueprint, its triennial RTP, and the shorter-term programming needed to fund the improvements, the RTIP, together form the foundation and the key stone for improving transportation system performance while at the same time assuring the timely attainment of air quality goals within the SCAB. Assessing the consistency of emission reductions deriving from these mobility strategies against the corresponding mobile source emission budgets contained in the applicable SIP elements, serves as the basis for determining reasonable further progress, and provides the information needed in assuring the timely implementation of each component of the set of TCM strategies described in this document.

Enforceability and Monitoring

The federally funded projects and programs that make up the triennial RTP and the biennial RTIP form the basis for assuring an enforceable commitment for each specified element of the TCM. Federal law requires that funding priority be given to TCMs in developing the RTIP. Therefore, the report on the timely implementation of the TCM strategies will continue to serve as one of the methods of monitoring the air quality impacts of transportation system improvements. In addition, based on the methodology developed by Caltrans and currently in use by all rideshare agencies throughout the state, an annual survey to assess changes in travel behavior will be conducted. SCAG's own State of the Region Commute, though focused on a larger geographic area than just the SCAB, also provides information in tracking progress.

The 2002 RTIP provides for timely implementation of the TCM strategies for the SCAB. The RTIP is a short-term document covering six years, and it must be updated at least every two years. As the biennial element of the RTIP is revised, the list of fiscally constrained projects, or, rather, projects for which funding has been identified, will be updated.

The EPA Transportation Conformity Rule states that timely implementation is to be measured against the TCM strategies in the applicable implementation plan. SCAG evaluates the three TCM category projects to determine the anticipated level and current status of implementation.

The enforceable commitment for TCM measures is to report on the funding and implementation of the first two years of the six-year biennial RTIP. The list of fiscally constrained projects will advance, or "roll forward", and the enforceable commitment will automatically be revised to encompass the first 2 years of the constrained projects contained in each new RTIP. The implementation status of TCM projects is reported on in subsequent RTIPs until the TCM projects have been reported as completed. In projecting the long-term (2005, 2010, 2020, etc.) impacts which could be ascribed to this measure in the Plan, however, the facilities proposed to be built in the long-term timeframe and programs as they exist today serve as the basis for modeling travel and emission impacts.

In addition to the mechanisms described above, SCAG will implement a two-tier monitoring system to track the investments and performance criteria of each intervention of the TCM strategy.

Funding

Table 3, below, summarizes the appropriate sources of funding for each component of the TCM strategies, providing a basis for ensuring enforceability. Public funding mechanisms, such as the process by which County Transportation Commissions (CTCs) program funds into the RTIP, are part of the procedure by which the accountability of the regional transportation infrastructure is assured.

TABLE 3

Enforceable Mechanisms and Monitoring Systems

TRANSPORTATION IMPROVEMENT MEASURES	ENFORCEMENT MECHANISM			MONITORING SYSTEM
	Public Funding	Public Approval	State Law	
HOV Measures	✔			Timely implementation (for conformity); funding priority given to TCMs by County Transportation Commissions and SCAG
Transit and Systems Management Measures	✔			Timely implementation (for conformity); funding priority given to TCMs by Transportation Commissions/SCAG/Local Governments
Information-based Measures	✔			Statistically significant random sample survey of actual transportation trip-making

Private funding, which contributes to the creation or acceleration of markets, is also an important component in ensuring that implementation actions occur. Although other technologies may necessitate refinements in institutional mechanisms to assess market predictability, the fundamental components for managing markets are taken to already exist. Marketing studies, such as those performed for rideshare programs, van-pool surveys, and other statistical data may be used to track such market trends. Review or oversight panels such as the Mobile Source Review Committee (MSRC) have also, historically, served an important role in helping link market trends to funding sources, and have helped manage private and public sector needs and expectations.

Public approval processes, such as those which direct local city and county agencies, have long provided surety in the on-going accountability of planning actions. Deployment plans for specific technologies, such as the proposed magnetic levitation (MagLev) rail system proposed for Southern California, could provide similar benchmarks to guarantee that implementation occurs as intended. Further details on specific enforceability mechanisms is provided in the discussion of specific measures.

It is important to note that each iteration of the RTP and RTIP provide increased implementation definition for the region's transportation system. Thus, further details and action plans for the implementation of the transportation strategy will be incorporated into the next RTP scheduled for adoption in June 2004.

Fiscally Constrained Projects from the 2001 RTP[8]

[8] See <http://www.scag.ca.gov/rtp/webpdfs/appendix_K.pdf> [2001 RTP:p. K2-K11]